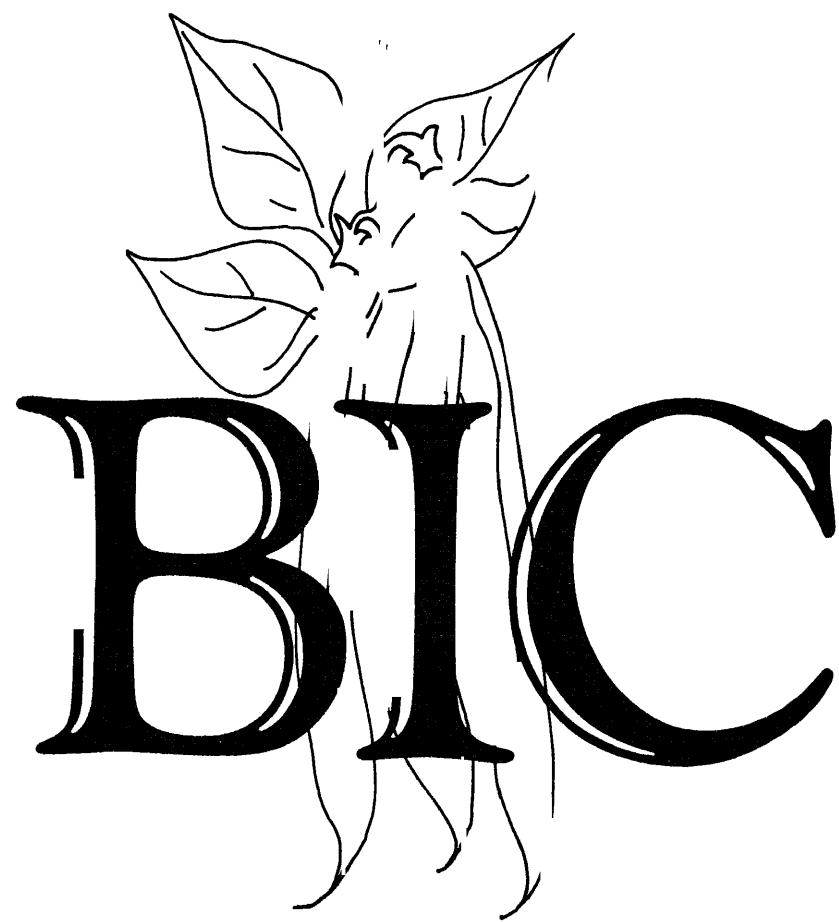


BIC

**ANNUAL REPORT OF THE
BEAN IMPROVEMENT
COOPERATIVE**



A VOLUNTARY AND INFORMAL ORGANIZATION
TO EFFECT THE EXCHANGE OF INFORMATION AND MATERIALS

**VOLUME 34
1991**

The XXXIV
Report of The
BEAN IMPROVEMENT COOPERATIVE

No. 34

March 1991

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THE XXXIV ANNUAL REPORT OF THE BEAN IMPROVEMENT COOPERATIVE

This year's report compiles another interesting and diverse array of research from and activities of BIC members. I do not have any new information or changes to share with you. Of course we were all saddened by the loss of Dr. Fred Saettler to cancer last year. The BIC financial statement is still in the black, however, I am concerned about the impact of recent postage increases upon our distribution of the 1991 annual report and future correspondence. We hope that you will be able to join us for the next biennial meeting of the BIC in Lincoln, Nebraska.

Dr. Howard F. Schwartz for the Coordinating Committee

1991 BIC MEETING IN LINCOLN, NEBRASKA

The 1991 BIC meeting will be held in the Cornhusker Hotel and Conference Center, 333 South 13th Street, Lincoln, Nebraska 68508 (telephone 402-474-7474) during the week of November 4-7. The National Pea Improvement Association will meet from Nov. 3-4, the National Dry Bean Council meeting will be held during the afternoon of November 4. Other professional meetings (W-150, Crop Advisory Committees, etc.) will be scheduled before, during and after the BIC meetings. It is recommended that people attending these meetings fly on Saturday, November 2 to realize substantial cost savings (in many cases about half cost). It is also recommended that people attending the meetings stay at the Cornhusker Hotel so that we can obtain free meeting space and reduce costs. There is a free shuttle (provided by hotel) from the airport to the hotel and return. The quoted price from the hotel is \$ 58.00 - single occupancy and \$ 68.00 - double occupancy plus tax. The Cornhusker is a modern hotel with attractive meeting and guest rooms. The hotel is near many fast food places and other restaurants, and the downtown campus of the University of Nebraska. Transportation will be available for those wishing to visit plant scientists working in various departments on the East Campus.

The call for abstracts will be distributed to all BIC members in early June of 1991, and the local organizers will use the same format as in previous meetings. If any individual or group is interested in helping sponsor coffee breaks, publication of the abstracts and proceedings, and/or stipends for outstanding student presentations, please contact the BIC President or local organizers. The planning committee consists of co-chairmen Dermot P. Coyne (402-472-1126) and James R. Steadman (402-472-3163), with support from Lisa Sutton, Dale T. Lindgren and David S. Nuland.

IN MEMORIAM - Dr. A. W. (Fred) Saettler

Dr. Alfred W. (Fred) Saettler, USDA/ARS Research Plant Pathologist, Michigan State University, died from cancer on May 28, 1990 at the age of 50. Dr. Saettler retired from Federal service on May 5, 1990. He served as the Unit Research Leader from 1984 to June, 1989. He was best known for research on diseases of beans and his numerous contributions to improvement of this crop. He was recognized internationally as an expert on foliar bacterial diseases, and trained numerous graduate students from around the world.

His research, covering nearly 25 years at Michigan State University, resulted in publication of approximately 100 papers, including eight chapters in books and 38 papers in high quality scientific journals. Fred was also editor of an important book on detection of bacteria in seeds and other propagative units. His reputation as a plant scientist was evident in the fact that he was invited to share his knowledge with colleagues at many scientific seminars and symposia at state, national, and international levels. His generosity and willingness to contribute also extended to plant pathology and bean improvement, and his example continues to make a significant impact upon those who had the unique opportunity to work with and learn from him.

He received several personal awards and honors; recent awards include the 1990 Michigan Crop Improvement Association Membership Award, and of course the Bean Improvement Cooperative Meritorious Service Award in 1989 (see the writeup in the 1990 BIC Report 33:v-vi).

BEANGRO Version 1.00

Gerrit Hoogenboom and J. W. White
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BEANGRO is a process oriented computer model which simulates vegetative growth, reproductive development, and yield of dry bean or common bean (*Phaseolus vulgaris* L.). The model has been developed under the auspices of the International Benchmark Sites Network for Agrotechnology Transfer (IBSNAT) Project and has input and output data structures, which are compatible with the Decision Support System for Agrotechnology Transfer (DSSAT) of IBSNAT. Users can simulate specific experiments by either changing cultivar, soil, weather, or management conditions, and compare results with experimental data. The tables in this paper give an overview of the weather inputs (Table 1), soil inputs (Table 2), and crop management inputs of the model (Table 3). Processes simulated include vegetative and reproductive development (Table 4), biomass growth and partitioning (Table 5), and a plant and soil water balance (Table 6).

Minimum hardware requirements include an IBM or compatible microcomputer with DOS 3.0 or later, 512K RAM, two floppy disk drives, and a graphics monitor. The model will operate faster if a math co-processor and/or a harddisk are installed. The model is distributed on four double side double density 5.25 inch diskettes or one double side high density 5.25 or 3.5 inch diskette. Included are executable code, example data sets, graphics display programs, source code, and a user's guide. This first version of the model is distributed at no cost, except for the price of diskettes. For further information contact Dr. Gerrit Hoogenboom, Department of Agricultural Engineering, The University of Georgia, Griffin, Georgia 30223-1797; Phone : 404-228-7216; FAX : 404-228-7270; Email : GHOOGEN @ GRIFFIN.UGA.EDU.

Table 1. Weather Inputs for BEANGRO.

Minimum Air Temperature	°C
Maximum Air Temperature	°C
Total Solar Radiation	MJ/m ²
Total Precipitation	mm
Each Variable is Defined on a Daily Basis	

Table 2. Soil Inputs for BEANGRO.

<u>Each Soil Layer</u>	
Layer Thickness	cm
Lower Limit of Plant Extractable Soil Water	cm ³ /cm ³
Drained Upper Limit Soil Water Content	cm ³ /cm ³
Saturated Soil Water Content	cm ³ /cm ³
Moist Soil Bulk Density	g/cm ³
Root Length Distribution (Relative)	-
<u>Entire Profile</u>	
Bare Soil Albedo	-
Upper Limit of Stage 1 Soil Evaporation	mm
Soil Water Drainage Constant	Fraction drained/day
U.S. Soil Conservation Runoff Number	-

Table 3. Crop Management Inputs for BEANGRO.

Planting Date	Day of Year
Row Spacing	m
Plant Spacing	m
Planting Depth	cm
Cultivar Selection(s)	-
Soil Type(s)	-
Irrigation	
Dates	Day of Year
Amounts	mm

Table 4. Vegetative and Reproductive Developmental Stages Predicted in BEANGRO.

Emergence	V-0
First Full Leaf (Unifoliate)	V-1
End of Juvenile Phase	-
Flowering Induced	R0
First Flower	R1
First Pod	R3
First Full Pod	R4
First Full-Size Seed	R5
End of Pod Addition	-
Physiological Maturity	R7
Harvest Maturity	R8
End of Main Stem (Vegetative) Growth	
End of Leaf Expansion (Whole Plant)	

Table 5. Biomass Processes and Variables Simulated in BEANGRO.

<u>Processes</u>		
Canopy Light Interception		
Two-Dimensional Canopy Expansion		
Photosynthesis		
Maintenance Respiration		
Growth Respiration		
Carbohydrate Partitioning		
Growth of Leaves, Stems, and Roots		
Growth of Seeds and Shells		
Nitrogen Mobilization		
Senescence as a Function of Age		
Senescence as a Function of Stress		
<u>Variables</u>		
Leaf Weight	LAI	SLA
Root Weight	Root Length Density	
Stem Weight		
Seed Weight	Number of Seeds	Seed Size
Pod Weight	Number of Pods	Number of Seeds per Pod
Biomass	Harvest Index	Shelling Percentage
Canopy Height	Canopy Width	
% N in Leaves, Roots, Stems, Seeds, and Shells		

Table 6. Water Processes and Variables Simulated in BEANGRO.

<u>Processes</u>
Infiltration
Runoff
Soil Water Flow Between Individual Soil Layers
Drainage
Flooding (Percolated Water Table)
Root Water Uptake for Each Soil Layer
Transpiration
Soil Evaporation
<u>Variables</u>
Potential Evapo-Transpiration
Drought Stress Factor
Total Root Water Uptake
Soil Water Content for Each Individual Soil Layer
Total Extractable Soil Water

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Dues collected and sale of back issues	\$ 3,405.00
Bank account interest earned	45.49
1989 BIC meeting contribution	1,227.33

Expenses

Printing & photocopying (1990 issue)	\$ 1,993.95
Postage	1,372.89
Office supplies	172.52
Secretarial services	443.90

Cash on hand

1991 dues	\$ 2,508.79
1992 dues	685.00
1993 dues	162.00
1994 dues	42.00

Balance on hand March 15, 1991	<u>\$ 3,397.79</u>
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